

## Mathematics GCSE Descriptors

A student working at U1 can		
<p>Group items into 10s to aid addition Order simple lists of numbers Read and write all the numbers up to 10 Use addition and subtraction for simple sum Understand the value of money Be able to describe simple 2D shapes Be able to spot and continue simple number patterns</p>		<p>Use the vocabulary of time including days, weeks and months Be able to sort data into simple category Be able to give simple reasons to justify an answer Understand simple fractions Record work using simple diagrams Understand the units of measurement for length and weight</p>

A student working at U2 can		
<p>Understand the place value of digits Order large numbers Confidently use halves and quarters Know that subtraction and addition are inverse operations Use mental calculations for simple addition and subtraction including money Use written methods for calculations Continue a sequence in increasing/decreasing steps</p>		<p>Identify 2D/3D shapes Begin to use a wide range of measurements Understand basic vocab relating to data handling Be able to collect simple data Be able to record data in tables Be familiar with simple diagrams for displaying data</p>

A student working at U3 can		
<p>Confidently use numbers up to 1000 Be able to round simple numbers Order positive and negative numbers – including the use of temperatures Understand and recognise common unit fractions Be able to use decimals Be able to perform simple divisions Solve whole number problems using all four operations</p>		<p>Be able to solve simple equations Be able to recognise the nets of 3D shapes Recognise lines of symmetry for basic shapes Be able to calculate area and perimeter by counting and formulae Be able to construct simple bar charts and pictograms Understand terms relating to angles and directions</p>

A student working at Grade 1 can		
<p>Work with coordinates in the first quadrant Use the standard terms for labelling sides and angles in diagrams Be able to use the basic geometric vocabulary Order positive and negative integers Order positive and negative decimals Use standard units of mass, length, time and money</p>		<p>Use the probability scale Change freely between related standard units of measurements Understand and use standard compound units of measurements Interpret and construct tables, charts and diagrams</p>

A student working at Grade 2 can		
<p>Be able to manipulate algebraic expressions including brackets</p> <p>Solve simple linear equations</p> <p>Generate terms in a sequence</p> <p>Work with coordinates in all four quadrants and solve geometrical problems</p> <p>Know the properties of 2D and 3D shapes</p> <p>Know the basic rules of angles (straight line, about a point etc)</p> <p>Order positive and negative fractions</p>		<p>Use the inequality signs</p> <p>Round numbers to decimal places</p> <p>Use the concepts of primes, factors and multiples</p> <p>Calculate basic probabilities</p> <p>List the possible outcomes</p> <p>Understand the concept of ratios</p> <p>Calculate basic percentages</p> <p>Compare simple data sets by calculating averages (mean, median, mode)</p>

A student working at Grade 3 can		
<p>Recognise and sketch the graphs of linear and quadratic functions</p> <p>Solve multi-step linear equations and find approximate solutions on a graph</p> <p>Substitute values into expressions and formulae</p> <p>Recognise special number sequences (square numbers etc)</p> <p>Deduce and use the nth term for a linear sequence</p> <p>Expand a single bracket</p> <p>Factorise simple expressions</p> <p>Calculate co-ordinates to draw linear and quadratic graphs</p> <p>Interpret plans and elevations of 3D shapes</p> <p>Accurately measure and draw line segments and angles</p> <p>Know and apply the formula to calculate area of 2D shapes (including composite shapes)</p> <p>Know and apply the formula to calculate the volume of 3D shapes</p> <p>Know and apply the formulae for area and circumference of circles</p> <p>Calculate percentage change and percentage increase/decrease</p>		<p>Be able to identify angles within parallel lines</p> <p>Use the angle sum of a polygon</p> <p>Change between top heavy fractions, mixed numbers and decimals</p> <p>Estimate answers by rounding</p> <p>Round to significant figures</p> <p>Apply all four operations to positive and negative integers, decimals and fractions</p> <p>Understand place value</p> <p>Use BIDMAS in calculations</p> <p>Use prime factor decomposition, HCF and LCM</p> <p>Use positive powers and associated integer roots</p> <p>Show outcomes using lists and Venn diagrams</p> <p>Divide an amount in a ratio</p> <p>Draw scatter graphs and identify correlation</p> <p>Change freely between units including units for area and volume</p> <p>Use scale factors in diagrams and maps</p> <p>Interpret and construct pie charts</p> <p>Construct sample space diagrams and use to calculate probabilities</p> <p>Solve simple proportion problems</p>

A student working at Grade 4 can		
<p>Plot and interpret real life graphs</p> <p>Solve multi step equations including brackets and fractions</p> <p>Solve linear inequalities</p> <p>Use quadratic sequences</p> <p>Use the basic laws of indices</p> <p>Be able to rearrange formulae</p> <p>Expand two brackets</p> <p>Be able to use the standard constructions</p>		<p>Know and use Pythagoras' theorem</p> <p>Describe congruent and similar shapes</p> <p>Use basic congruence rules for triangles</p> <p>Complete simple transformations</p> <p>Estimate powers and roots of positive numbers</p> <p>Calculate with positive indices</p> <p>Use standard form for describing large and small numbers</p>

Construct plans and elevations for 3D shapes Interpret scatter graphs – use lines of best fit to make predictions Calculate exactly with fractions		Use compound measures for speed, density and pressure Interpret and construct time series graphs Apply systematic listing strategies Identify circle definitions and properties
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A student working at Grade 5 can		
Find the equation of a line through two points Sketch simple cubic and reciprocal functions Solve quadratics by factorising Find approx. solutions to quadratics using a graphs Solve simultaneous equations Recognise geometric progressions Factorise simple quadratics including the difference of two squares Use $y=mx+c$ to identify parallel lines Calculate the volume and surface area of solids Calculate arc length and area of sectors Apply similarity rules between similar figures Know and use the formulae for the trig ratios Know exact trig ratio values for key angles		Apply calculations with vectors Enlarge shapes with a fractional scale factor Calculate with negative indices Calculate exactly with multiples of pi Use inequalities to specify error intervals Apply limits of accuracy Use tree diagrams to calculate probabilities and combinations Compare lengths, areas and volumes using ratio Understand direct and inverse proportion Interpret the gradient of a straight line as a rate of change Recognise and interpret graphs that illustrate proportion Solve growth and decay problems

A student working at Grade 6 can		
Solve quadratics by factorising Manipulate expressions by expanding two brackets Apply trig and Pythagoras in complex problems Enlarge shapes with a negative scale factor Combine series of transformations Identify, describe and construct similar shapes		Apply systematic listing strategies including the product rule Calculate with fractional indices Calculate exactly with surds Construct and interpret cumulative frequency graphs Interpret and compare data using box plots Interpret and compare data using quartiles and inter-quartile range

A student working at Grade 7 can		
Simplify expressions by expanding a product of more than two brackets Manipulate expressions using surds Sketch graphs of exponential functions Sketch the graphs of trig functions Recognise and use the equation of a circle Solve equations using the quadratic formula Factorise harder quadratics Use able to support and construct proofs		Apply and prove the standard circle theorems Apply the concepts of similarity to area and volume Use $\text{Area} = \frac{1}{2}ab\sin C$ to find the area of triangles Simplify expressions with surds Apply upper and lower bounds in calculations

Form the equations of perpendicular lines Know and apply the sine and cosine rule in simple cases Construct and use histograms Evaluate functions		Calculate conditional probabilities using two way tables, Venn diagrams and tree diagrams Construct equations to describe direct and inverse proportion Use general iterative processes to solve growth and decay problems
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A student working at Grade 8 can		
Manipulate expressions involving algebraic fractions Identify turning points by completing the square Sketch translations and reflections of functions Plot and interpret exponential graphs in a real life context Calculate/estimate the gradient of linear graphs Calculate/estimate the area under linear graphs and interpret in context (e.g. distance-time, velocity-time) Solve quadratics by completing the square		Find approximate solutions using iterations Solve linear inequalities in two variables Recognise and use sequences written as surds Calculate the nth term of quadratic sequences Apply Pythagoras and trig in 3D figures Use vectors to construct geometric arguments and proofs Know and apply the sine and cosine rule in more complex cases Use upper and lower bounds in complex calculations Rationalise denominators

A student working at Grade 9 can		
Calculate or estimate the gradient of quadratic or other non-linear graphs Estimate the area under quadratic and non-linear graphs and interpret in real life cases Find the equation of a tangent to a circle at a given point Complete the square for complex quadratics		Solve one linear and one quadratic simultaneous equation Interpret the succession of two functions as composite functions Interpret the reverse process as the inverse functions Use vectors to construct complex geometric arguments and proofs

A +/- system will be used to indicate a student's understanding within a particular grade.

For example

- **4-** means a student can confidently use some of the topics listed in grade 4
- **4** means a student can confidently use around half of the topics listed in grade 4
- **4+** means a student can confidently use most of the topics listed in grade 4